ABSTRACT

Nowadays, new forms of virtual architecture are appearing as virtual worlds based on the Metaverse concept are becoming increasingly more popular; holding all kind of virtual versions of human activities. This paper aims to make a reflection on the features of these new architectures compared with their equivalents in the real world by means of an analysis through the prism of the three fundamental conditions of the classic architecture: Firmitas, Utilitas and Venustas. The text describes how these principles once stated by Vitruvius are now affected, modulated or changed in the digital realm by the introduction of the Virtualitas concept.

Keywords: Cyberarchitecture, Metaverses, Virtual Architecture, Virtual Worlds, Vitruvius

INTRODUCTION

Partes ipsius architecturae sunt tres, aedificatio, gnomonice, machinatio (....) Haec autem ita fieri debent, ut habeatur ratio firmitatis, utilitatis, venustatis... (Vitruvius Pollio, 23 -27 adC)

There are three departments of architecture: the art of building, the making of time-pieces, and the construction of machinery (....) All these must be built with due reference to durability, convenience, and beauty... (Morgan, M.H, 1914)

Throughout history, technological changes have contributed to the generation of strong cultural and social changes. The vanguard of the Modern Movement found the spirit of their time, the Zeitgeist, in the machine, referring to the set of technologies that emerged in their period such as airplanes and cars. Something similar happens to the citizen of our time in the constant interaction with their environment; both real and virtual.

Today, the world is constantly connected through wireless networks, smartphones, social networks, and such technologies. Cyberspace, in the Gibson (1984) metaphor, is becoming a constant, integrated fully into our daily lives.

The Metaverse -- a tridimensional, immersive virtual world that allows real time interaction, communication and content creation by users -- has gained popularity in recent years.

Advances in the use of Metaverses as platforms for human activities in fields diverse as culture, science, education, heritage, and gaming reflect a part of the global development of our society with broad participation and collaboration as basis for the generation of collective knowledge.

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The potential goes beyond acting as enabler of human connections and social activities, extending into the possibility of sharing “life like” experiences in a virtual space. These synthetic environments present innovative aspects that no doubt constitute a field for formal and spatial investigation in architectural design, being conceptually distinct from the purely “scenographic” architecture present in other tridimensional environments such those found in many video games, where buildings are more “facades” rather than complete and act only as a set where the action takes place, instead of having a fully functional structure and a real use.

Analysis of different sources covering this technology (Kzero, 2012; Johnson et al., 2011) manifests an encouraging panorama as regards the reach, potential, and adoption by users, especially the digital native, who naturally take on the use of virtual worlds as places of meeting and activities with their peers. Such users will inhabit the more advanced, more realistic, more sensory immersive virtual spaces of the future.

**BACKGROUND: PIONEER TECHNIQUES**

**Digital Representations of Real World Architecture**

The techniques used in architectural visualization have always been linked to the historical, technical and cultural moment in which they develop. The great paradigm shift in the techniques of architectural representation which took place in the late eighties was enabled by the development of Computer Aided Design. The development of these new systems allowed an evolution from the classical representation modes based in plans, elevations and cross-sections, perspectives and physical models to a new, more complete, three dimensional form existing in virtual space which can provide almost unlimited views of a design.

There is little doubt of the excellent visual quality of renders and animations which can be achieved from a three dimensional model of a building. Rendering algorithms allow the modeler to attain a level of hyperrealism so that the digital image can be indistinguishable from the real. Nevertheless, a digitally generated image of a building is not an example of cyberarchitectural design. Despite being of a hyperrealistic quality and existing in virtual space, such representations serve as merely as objects of passive observation, viewable by the user but as a mere spectator with no opportunity to “use” the virtual building in any way. Hence, such representations are unable to host human activities.

**Digital Architectural Experimentation**

During the last twenty years, cyberspace has been used as a laboratory for experimentation by a number of architects. They have coined new concepts such as *Liquid Architecture* (1991) and *Transarchitecture*, defined by Novak (1996); *Blob Architecture*, which arose after Greg Lynn’s experimentation with Metaballs (1996); or the relation between cyberspace and physical architectural space called *Cybrid* by Peter Anders (1998). New shapes and contents have been created such as: *GreenSpace* (Mandeville et al., 1993), *Guggenheim Virtual Museum* (Asymptote Arch., 1999), *Bespace* (Guynup, 2003) or *CityCluster* (Fischnaller & Hill, 2005). Some have also created mixed experiences, hybrids of different media, where architecture acts as the interface of an interactive system where the user is the one who actively defines the space through touch, light or movement. In this line, examples include: *Spacestation* (Oosterhuis, 1998), *Water Pavillion* (Schwartz, 1999), *Aegis Hyposurface* (Goulthorpe, 1999) or *D-Tower* (Serafijn & Spuybroek, 2004).

According to Novak (1991) “Cyberspace can be seen as a vast virtual laboratory for the continuous production of new architectural visions.” In this sense, his various proposals, together with those of other pioneers such as Greg Lynn, are fundamentally based on the use of virtual space for the generation of conceptual experiments with architectural forms, focused
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